

The Examiner alleges that Allroth discloses the invention substantially as claimed. Issue is taken in this respect.

For example, the Examiner takes a position that Allroth discloses a process comprising "mixing ferrous metal powder with a lubricant to form a mixture". No issue is taken in this respect. However, process claim 1 requires a step of "mixing particles of a metal powder with a lubricant . . . and at least one liquid phase former to form a mixture". Allroth does not describe or teach the use of a "liquid phase former". In fact, nowhere in Allroth is the term "liquid phase former" used. Accordingly, the rejection of claim 1 as being unpatentable over Allroth in view of Ozaki is not warranted pursuant to the provisions of 35 USC 103.

Further, claim 1 requires the step of "sintering the compressed mixture at a sintering temperature sufficient to evaporate and drive off said lubricant and to effect a liquid phase sintering of said liquid phase former with said particles of metal powder....." There is no description or teaching in Allroth of a liquid phase former much less a step of sintering "to effect a liquid phase sintering of a liquid phase former with particles of metal powder". For this additional reason, the rejection of claim 1 as being unpatentable over Allroth in view of Ozaki is not warranted pursuant to the provisions of 35 USC 103.

As set forth in applicants' description at page 3, beginning on line 4, the liquid phase former that is used has a characteristic of forming a liquid phase during sintering and of becoming part of the final product after sintering and at page 5, beginning on line 8, and that during the thermal sintering cycle, the surface and surface composition of the metal particle and the liquid phase former form a surface composition that upon further heating will liquefy forming a liquid film and provides surface tension which aids

the densification process. This new result is not described or taught by Allroth.

Allroth provides that a metal powder may be mixed with different additives selected from a group consisting of graphite, ferrophosphorus, hard phase materials, machineability enhancing agents, flow enhancing agents, lubricants. (Column 2, lines 60 to 64). Allroth teaches that graphite may be added to the powder to increase mechanical properties (column 2, lines 64 to 66). There is no teaching that the graphite is a lubricant or a liquid phase former. It is known that graphite particles will diffuse while in the solid state into iron particles, i.e. a solid state diffusion, during heating. However, the graphite does not form a liquid phase during this solid state diffusion.

Allroth also provides that another alternative is to provide the powder particles with a lubricant coating or film before compaction is performed with the lubricant being selected from metal soaps, waxes and thermoplastic materials. (Column 3, lines 5 to 15).

Allroth further teaches that non-aggregated spherical gas atomised powders cannot be HVC compacted in accordance with the Allroth process (Column 2, lines 56 to 59) and that normally used compaction equipment does not work quite satisfactorily as the strain on the equipment will be too great. Accordingly, Allroth teaches that the high densities required may be obtained by the use of the computer controlled percussion machine disclosed in US Patent 6,202,757. (Column 3, lines 20 to 25). This type of compaction is referred as high velocity compaction (HVC).

Allroth discloses that the compacts obtained by the high velocity compaction may be sintered at low temperatures or may be sintered at higher temperatures up to 1400°C (column 4, lines 44 to 47 and 57 to 60). However, there is no teaching of the

sintering step of claim 1, i.e. sintering the compressed mixture at a sintering temperature sufficient to effect a liquid phase sintering of a liquid phase former with the particles of metal powder.

It is respectfully submitted that Allroth does not disclose the lubricant as including graphite. Instead, Allroth teaches that the lubricant can be selected among conventionally used lubricants such as metal soaps, waxes and thermoplastic materials. (See column 3, lines 11 to 17). Of note, the lauric acid of Ozaki is described as a fatty acid. Further, Ozaki states that the lubricant "is a fatty acid amide and/or a metal soap" (column 4, lines 41 to 42) whereas Allroth already describes the use of metal soaps as a lubricant.

Claim 1 further requires the step of "compressing the mixture at a pressure sufficient to liquefy and uniformly distribute the lubricant ... with the lubricant effecting a uniform distribution of said liquid phase former on said particles of metal powder". There is no teaching in Allroth that the compression of a mixture is at a pressure sufficient to (1) liquefy and uniformly distribute the lubricant within the compressed mixture and (2) have the lubricant effect a uniform distribution of "said liquid phase former on said particles of metal powder" as required by process claim 1. Accordingly, for this additional reason, a rejection of process claim 1 as being unpatentable over Allroth in view of Ozaki is not warranted pursuant to the provisions of 35 USC 103.

The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993) (reversed rejection because inherency was based on what would result due to optimization of

conditions, not what was necessarily present in the prior art); *In re Oelrich*, 666 F.2d 578, 581-82, 212 USPQ 323, 326 (CCPA 1981). "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.' *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (citations omitted).

Claims 2 to 10 depend from claim 1 and are believed to be allowable for similar reasons.

Further, claim 5 requires a compaction pressure of 35 to 70 tons per square inch. Allroth teaches the use of a percussion machine that employs high velocity compaction. There is no teaching of the compaction pressure. Of note, US Patent 6,202,757 does not describe or teach any compaction pressure.

In view of the above, a rejection of claim 5 as being unpatentable over Allroth in view of Ozaki is not warranted pursuant to the provisions of 35 USC 103.

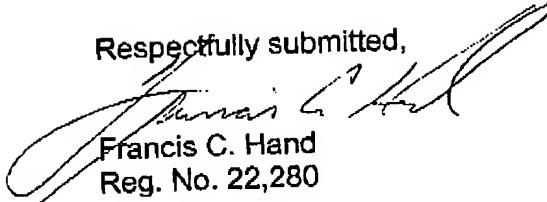
Claim 7 depends from claim 1 and further recites that the compaction pressure is greater than 45 tons per square inch. Again, there is no such teaching in Allroth or US Patent 6,202,757.

Claim 11 depends from claim 1 and is believed to be allowable for similar reasons. In this respect, the Requirement for Restriction is not relevant to dependent claim 11.

The application is believed to be in condition for allowance and such is

respectfully requested.

Respectfully submitted,



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